

*Proof*

*Compliments  
Thos C Donnet*

APPENDIX No. 1.

PRELIMINARY REPORT OF ENGINEER.

TO THE CHAIRMAN OF COMMITTEE UNION PACIFIC R. R. CO.:

DEAR SIR:—In accordance with the instructions in your letter of September 6, 1862, directing me to examine, with reference to their practicability for a Railroad route, the passes between the one hundredth and the one hundred and twelfth parallels of longitude, and to gather such information as I could, of the productions, mineral and vegetable, of the extended region between the Missouri River and the Great Basin, I left Omaha city and followed the usual line of travel up the north side of the Platte as far as Fort Kearney.

A rolling prairie of some eighteen miles in width, cut up by the Pappillion creek and its branches, separates the valleys of the Missouri and the Platte, but can be crossed without much difficulty.

The Elkhorn river, a considerable stream well timbered with hard wood, flows near the bluffs of the Platte; and, from its crossing to Kearney the valley resembles in soil and general appearance the Terre Coupee prairie, Indiana, being generally level, and along the road well settled and cultivated. For the entire distance, one hundred and fifty miles, you are not out of sight of a cornfield, and the portion along Wood river (which runs in the valley for at least forty miles) is very handsome, being a table about fifteen feet higher than the part of the valley nearer the river.

At points the Platte is about the centre of the valley, but generally runs nearer the south bluffs; its width varies from one-half mile to a mile, and it is full of islands; Grand Island, the largest, being sixty miles long. Cotton-wood grows on most of the islands, although at many points I noticed cedar.

Maple, Rawhide, Shell and Prairie creeks, Loup Fork and Wood rivers, run parallel, and some of them for long distances in the valley; on the heads of all these streams there is considerable hard wood timber, probably enough with what could be obtained from the islands in the river to furnish the ties that would be required along them.

Loup Fork is the only stream that would involve a large cost

a waterway of about one thousand feet in length being ed, with piers thoroughly protected by ice breakers. The his distance would be comparatively free from bridges and culverts, as the road could be so located that the drainage would be either into the Platte or some of the streams running parallel in the valley. I observed this in particular along Shell creek, which could be bridged with a forty foot span.

Crossing the eight channels of the Platte river to Kearney, the contrast with the cultivated lands on the Wood river table is very marked. The character of the soil seems to indicate that the valley above this point will never be cultivated to any great extent, except, perhaps, on the lowlands near the river. How far the arable lands on the north side extended west I had no means of determining, although I occasionally saw a cornfield there and on the islands, but none on the south, except at Cottonwood Springs: the travel being almost entirely on the south side.

From Fort Kearney to Julesburgh, at the mouth of Lodge Pole creek, a distance of nearly two hundred miles, the valley is very wide; that part below the mouth of the north Platte for a distance of forty miles, or more, being not less than twenty miles, the river running nearer the south side.

As far as Cottonwood, there is cedar on the islands in the river, and on the bluffs, and at that point there is a large grove, said to be more than a mile in width, and five or six in length; here the timber seems to end, and up to Fremont's Orchard, nearly two hundred miles, there is nothing but a few bushes along the river.

From Kearney to Julesburgh there is little difference in the two sides of the river for a railroad route, the grading required on either would generally be an embankment high enough for drainage.

From Julesburgh west, I partially examined three routes, the *first*, following the valley of Lodge Pole creek, crossing the Black Hills through the Cheyenne Pass into the Laramie Plains; the *second*, following up the Platte to the mouth of the Cache a Poudre, and near that stream to the summit, thence northwesterly until it unites with the first near the right hand fork of the Laramie river; the *third*, following the south Platte to Denver,

thence up Clear creek and crossing the snowy range at the Berthude Pass.

Lodge Pole creek enters the Platte from the northwest, although its general course from the Black Hills, a distance of one hundred and fifty miles, is nearly due east; it flows through a broad valley, rising more rapidly than that of the Platte, destitute of timber, except near the base of the mountains, and making a very direct route; the summit of the Pass is a narrow divide between the heads of this stream and a valley running nearly west into the Laramie Plains. I could not ascertain the ascent, but think a grade of sixty feet per mile would cross this summit with a rock cut not to exceed a half mile in length. The topography of the Pass is peculiar, and the summit very much lower than the range of the hills.

A very direct line can be laid from this Pass to the North Platte, crossing several mountain streams, and skirting the base of the Medicine Bow Mountains, which with the Black Hills are covered with pine to their summits. The supply of timber from this region will be sufficient for the wants of a Railroad for a great length of time, and would furnish all that would be required for construction to Salt Lake Valley.

The Laramie Plains are gravelly and somewhat undulating, but offer no serious obstacles to building a road. Like the Upper Platte near Denver they are covered with grass, which, though thin, furnishes abundant pasturage, and cattle and horses live during the winter without any other food. On a branch of the Platte near Medicine Bow, is a range of hills of iron ore, said to be very pure; the tests made by a gentleman who had devoted much time to mining in England showing a high percentage; it is also found in great abundance in the Black Hills, being part of the igneous rocks. Coal is also reported as being found in abundance near the mouth of Sage creek, and along the base of the Medicine Bow Mountains.

These plains are very beautiful, crossed as they are by bold mountain streams of clear cold water, dotted with small lakes, and surrounded with mountains of great elevation, covered with timber to near their summits; their elevation is nearly seven thousand feet, the atmosphere is remarkably clear, and sky generally free from clouds; they extend to the Platte river.

West of this the character of the country changes immediately; the soil becomes clay, and there is little vegetation, except sagebrush and greasewood, to Green river. A railroad line would ascend for a distance of twenty miles to Bridgers Pass, which from the elevation furnished by Lieutenant Bryan, I think might be reached by a grade of seventy feet per mile, the ascent being regular, as also the descent to the west. It is a valley with clay bottom, varying in width from one thousand to twenty-five hundred feet, with the mountains rising to a great elevation on either side. An earth or clay cut would be necessary here.

There was about three feet of snow in the centre of the Pass last winter, but it drifted very deep on the north side at the base of the mountain. Descending to the west you reach the valley of Mud creek, a branch of the Elkhorn river, and the Bituminous coal fields, which you cross, and continue in to Green river, a distance of one hundred and fifty miles. In the valley of Bitter creek it is particularly abundant, an out-crop showing at almost every point; it is more than probable that coal oil may be found in the Oolite formation here. The coal resembles the Erie Pennsylvania, burns with a flame nearly white, leaving no clinker; I could detect no sulphur in breathing the smoke.

Between Muddy and Bitter creeks is a wide plain with no rise of any importance, and a rail road line can be run down the valley of the latter with easy grades and little sharp curvature. Near the point where it empties into Green River, the bluffs, or sandstone buttes, rise about three hundred feet.

Green river, which was so low that we forded it, is a rapid stream, two hundred and fifty feet wide, with a narrow valley; coal and borax seemed very abundant, and I was told that iron, lead, and many other minerals have been found along it.

From this to Bear river the route should be in a Southwesterly direction, leaving Fort Bridger some twenty miles to the north and approaching the base of the Uinta mountains, and though heavier than most of the route east of it, there are no great difficulties to be encountered.

From Bear river to the north of the Timpanagos will be the most expensive portion of the entire route; you must ascend a branch of the former stream, make a heavy crossing into the Weber, follow it down to Kansas prairie, and then crossing over

to the Timpanagos, descend through Round prairie and the Canons of the river to Salt Lake valley. The Timpanagos runs for ten miles between vertical walls of rock, and there are points where the road must be cut in the sides as well as several crossings of the river, which in flood is a large stream; it breaks through the Wahsutch mountains, and with the exception of the Weber, furnishes the only passable access for a rail road to the valley from the east; from its mouth the route would continue northwesterly around the foot of Lake Utah, and thence west to Camp Floyd, or north, down the river Jordan to Great Salt Lake city; neither route would be difficult to build.

*The second route* that I examined, follows up the Platte, which is of the same character as the valley below, to the mouth of the Cache a Poudre. From the point where the stream breaks through the mountains, there is a rapid ascent for sixty miles to the ridge that separates it from the Laramie Plains; this opening is through sandstone and hornblende rocks, but a favorable line can be laid up it, although the ascent is greater than through the Cheyenne Pass, from the fact that Lodge Pole creek rises more rapidly to the base of the mountains than the Platte, the summit elevation varying little in either.

This sixty miles would require heavier grades and more curvature than the line through the Cheyenne Pass, and cost probably twice as much per mile; the descent into the Laramie Plains is comparatively light, and it would unite with the first route near the right hand fork of the Laramie river, increasing the distance sixty or seventy miles.

*The third route* follows on favorable ground and crosses the Platte at Denver, running thence nearly west to the base of the mountains, thence through the Canon of Clear creek and up the valley to Hoopes creek, which rises in the Berthude Pass.

Mr. Case's survey of this route from Denver, shows a heavy and expensive line up this valley, the road bed being cut in the mountain side at a considerable elevation for a number of miles; it ascends with a grade of one hundred and ten feet per mile, and crosses the snowy range with a tunnel three and one-half miles in length, and descends into Middle Park in a similar manner.

This pass is between three and four thousand feet higher than either of the others, and the rock cutting would be through either granite or hornblende. I did not go west of the Pass, but from Mr. Berthude, the engineer, who made the wagon road survey, and from whom the Pass derives its name, learned that this is the lowest depression in the Range, that the line west, as far as the Timpanagos river, where the line at Strawberry valley unites with the one I have indicated, presents no great difficulties, and could probably be built as cheap as the north line. He represents this region as producing grass in abundance, and thinks that at some points cereals may be successfully cultivated. Coal is found on Green river and its branches, similar to that on the north line.

I did not examine a route up the north Platte and through the south Pass; but the distance in this event would be increased sixty miles, which would counterbalance the four hundred feet less elevation of summit.

Taking the first route I have indicated, and upon the supposition that the main line starts on the one hundredth parallel of longitude in the Platte valley, a road can be built from Omaha to the Great Salt Lake valley, near the foot of Lake Utah, with a distance not to exceed nine hundred and sixty miles.

There are but four points on the entire route that probably ever will furnish any great amount of local business; they are the Rocky mountain gold region, of which Denver is now the business centre; the Medicine Bow and Platte river iron region; the Green river coal fields, and the Salt Lake valley. This route would meet the requirements of the last three, but not fully those of the first, as they are now developed.

My own conviction, however, is, that the range of the gold-bearing quartz is as extended as the snowy range itself, and that the few discoveries in the vicinity of South Park, and along Clear and Boulder Creeks, and their branches, are but the precursors of developments in the mountain chain that separates the three Parks, that will, in a very few years, yield a greater amount of treasure than is now furnished by California; and that important points may grow up north as well as south of the present centre. I talked with no miner who did not believe it as extended as I have described it.

A gentleman who accompanied me on the trip, and had devoted much time to prospecting and mining in California, told me, as we passed the different streams from Denver to the crossing of the North Platte, that in the St. Vrain, the Thompsons, the Cache a Poudre, the Laramie, and Medicine Bow, and their branches—streams issuing north and east from the range—he saw indications of gold in the quartz brought down quite as marked as in those on which they are now successfully mining. West of the Platte, all indications disappeared.

This line would be, at the nearest point, one hundred miles from Denver. At Julesburg, or the mouth of Lodge Pole Creek, the distance given from Denver, by the stage company's table of distances, is one hundred and fifty miles.

The serious objection to this route is, that it fails to meet the wants of the Denver gold region. To any one who has watched the mighty trains that are constantly thronging this road, and remembers that this is almost a purely mining population, where every article of consumption is transported from the Missouri river, the conviction cannot be resisted, that the road should be built there, if it can be done at a reasonable additional cost.

Careful surveys and estimates, accompanied by schedules of the tonnage, would determine its practicability.

The route up the Cache a Poudre would, at the nearest point, be probably within fifty miles of Denver.

The route through the Berthude Pass would meet the wants of business, but the practical difficulties are serious. In the sixty miles from Denver to the centre of the tunnel, Mr. Case makes on his grade, a rise of four thousand eight hundred and twenty feet, or eighty feet per mile; a large portion of the rise, however, must be made in the last twenty miles. The tunnel itself is three and one-half miles in length, and from one thousand to fourteen hundred feet below the summit of the Pass, with no probability of finding one lower.

The tunnel would, probably, be through granite; and most of the excavation from Golden City, the base of the mountains, to the boiling spring in the middle Park, a distance of about one hundred miles, would be granite or hornblende.

The elevation of the Berthude Pass above the level of the sea is

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11,410 feet; of the summit of Mr. Case's tunnel, 10,050 feet ; of Denver, 5,302 feet, and of Pike's Peak, 14,250 feet.

I presume that it will never be seriously urged that the middle Park, or any other section six or seven thousand feet above the level of the sea, can ever become, to any great extent, a successful agricultural country. The elevation of the Plains north and south of the Uinta Mountains, is doubtless about the same.

I have only incidentally alluded to the tonnage of the Plains, thinking that you could obtain more explicit information from other sources, but believe that even now, taking the California, the Salmon River, the Salt Lake, and the Denver travel and traffic, from the various points of leaving the Missouri river, that it would nearly equal in amount that of either of the roads west from Chicago. At any rate, by the time a road was built to the base of the mountains, it would have a business that would pay well.

The population of Utah, claimed to be about seventy-five thousand, located nearly central on the road ; active and industrious, their energies guided by a sagacious and far-seeing head, whose power is almost absolute, will aid materially in the successful prosecution of this enterprise.

They have already turned the mountain streams from their channels, and, by irrigation, changed a desert into farms, gardens, and orchards. They are producing, and will be able to export, besides fruits and cereals, wool, cotton, silk, paper, leather, iron, lead, copper, and salt, and are now introducing machinery for their manufacture.

The conviction seems general that they are destined to become a self-dependent people, and need a railroad mainly to carry off their surplus productions and bring back their emigration.

I can only add, to complete this report, what I have endeavored to show throughout, that I am satisfied the cost of the road will be less, and its business far greater than its most sanguine friends anticipate.

All of which is respectfully submitted.

PETER A. DEY.